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ABSTRACT

Text and small black and white photographs reproduced in this booklet outline a slide presentation of the significant design directions that influence the character of school facilities. The locations and names of the schools and the architectural firms accompany the pictures. Energy conservation factors are illustrated by schools of passive or active solar design, by earth sheltered designs, and by heat exchangers and sky lighting. The arrangements of buildings include campus and house plan schools, educational parks, and compact schools that have flexible space. Interior space design directions can be found in student streets, malls, commons, and atriums. "High tech" schools, constructed with contemporary industrial materials, create a new environment. Attention is also given to schools of a specialized nature such as magnet, community, career education, and special schools. Structural features are highlighted by earthquake code replacements and innovations such as air structures. Additions and renovations have recycled buildings for educational use, and also the reverse: surplus school space has been converted to serve new purposes. The location of schools is also featured by urban schools, environmental concerns, and regional characteristics. Finally, some new buildings are designed for possible future uses other than education. (MLF)

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ARCHITECTURE FOR EDUCATION

SCHOOL DESIGN STATE OF THE ART

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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EA 015 471

A COMMITTEE OF THE AMERICAN INSTITUTE OF ARCHITECTS WASHINGTON, D.C.

Early in 1982, the Committee on Architecture for Education of The American Institute of Architects prepared a two-screen slide presentation on SCHOOL DESIGN — STATE OF THE ART. It is a review of the evolution of school design in the United States, an overview of the present state of the art, a summary of current trends, and a look to the future.

On invitation from the American Association of School Administrators, the first presentation of this program was made at the AASA convention in New Orleans on February 28, 1982.

The AIA Committee on Architecture for Education is pleased to make this program available to members of the committee for presentation to other interested groups.

Committee on Architecture for Education
The American Institute of Architects

1982 Steering Group

J. Jeffrey Conroy, AIA, CRS Architects, chairman
H. Kennard Bussard, AIA, Bussard/Dikis Associates, Ltd.
Richard Fleischman, FAIA, Richard Fleischman Architects, Inc.
Charles F. Schrader, AIA, Reid & Tarics Associates
T. Jerry Lawrence, AIA, The Burr Associates

SCHOOL DESIGN — STATE OF THE ART
was prepared in four parts and presented by:

Part One: INTRODUCTION
J. Jeffrey Conroy, AIA, CRS Architects

Part Two: HISTORY OF SCHOOL DESIGN IN AMERICA
Stephen Friedlaender, AIA, HMFH/O'MARAH Associates

Part Three: SCHOOL DESIGN — STATE OF THE ART
C. William Brubaker, FAIA, Perkins & Will Architects

Part Four: CONCEPTS FOR THE FUTURE
H. Kennard Bussard, AIA, Bussard/Dikis Associates, Ltd.

This booklet, which serves as an outline for Part Three: SCHOOL DESIGN — STATE OF THE ART, was prepared by C. William Brubaker, FAIA, Perkins & Will Architects.

We wish to thank the many architects who designed the outstanding schools and provided slides for this presentation.

Also, special thanks to the American Association of School Administrators for providing slides from the annual Exhibition of School Architecture.

SCHOOL DESIGN – STATE OF THE ART

OUTLINE FOR SLIDE PRESENTATION BY THE COMMITTEE ON ARCHITECTURE FOR EDUCATION
THE AMERICAN INSTITUTE OF ARCHITECTS

FLEXIBLE SPACE

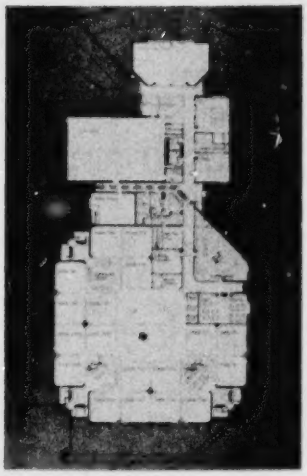
In many of the following examples of recent school design flexible space is an accomplished fact. These buildings will be readily adaptable to future changes in need.

THE COMPACT PLAN

A response to the desire for flexibility, efficiency, and energy conservation.

demountable partitions for flexibility →

classrooms clustered around media center →



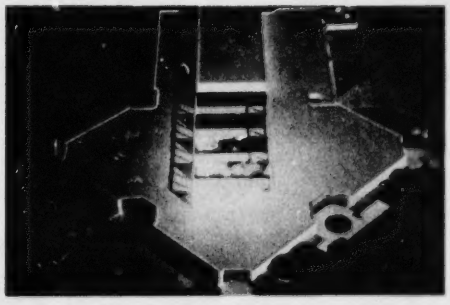
CROSSROADS ELEMENTARY SCHOOL
West DesMoines, IA

Bussard/Dikis Associates, Ltd.

AASA Shirley Cooper Award in 1977

HILL-ROBERTS AND HYMAN FINE ELEM. SCHOOLS
Attleboro, MA

Henneberg & Henneberg; and A.A. Trulli



TROY SCHOOLS DIST. ELEM. PROTOTYPE SCHOOLS
Troy, MI

TMP Associates

classrooms around media center →

DESIGN FOR ENERGY CONSERVATION

Passive solar design and earth-sheltered design

BROOKTREE ELEMENTARY SCHOOL
San Jose, CA

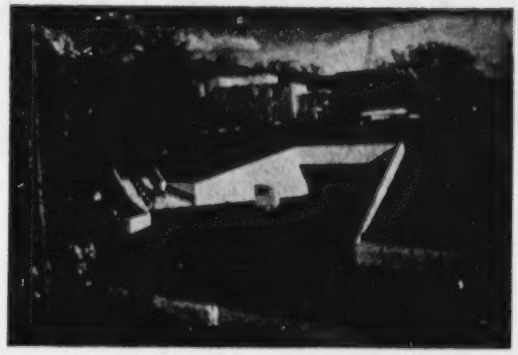
Porter-Jensen-Hansen-Manzagol

earth berms →

generally hidden from view and earth-sheltered →

CORNELL UNIVERSITY BOOKSTORE
Ithaca, NY

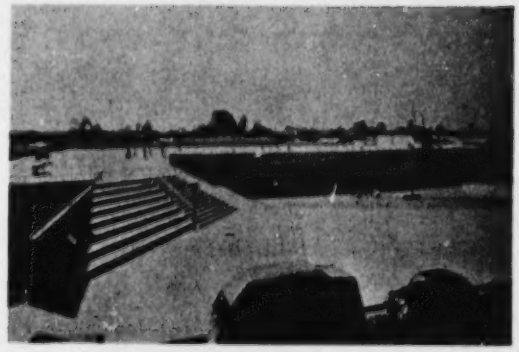
Earl R. Flansburgh & Associates, Inc.



FREEMONT ELEMENTARY SCHOOL
Santa Ana, CA

Allen & Miller

a partially underground school



underground college with 1½ feet of earth and landscaping above

OAKLAND COMMUNITY COLLEGE
SOUTHFIELD CAMPUS
Southfield, MI

Straub, Van Dine Associates

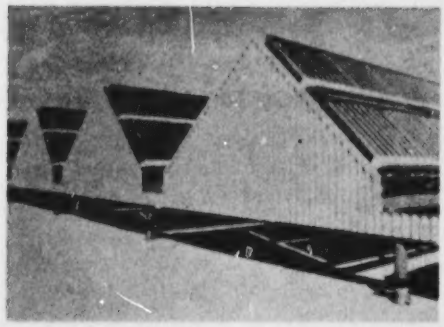
SOLAR ENERGY SYSTEMS

Active solar design, using rooftop solar energy collectors.

BUNCHE MIDDLE SCHOOL
Atlanta, GA

Stevens & Wilkinson

Atlanta has been a solar pioneer →

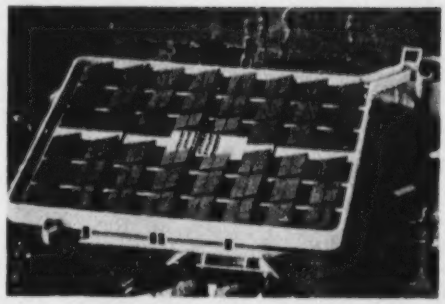


SOLAR ELEMENTARY STATE SCHOOL "K"
Miami, FL

Saez/Pacetti Architects

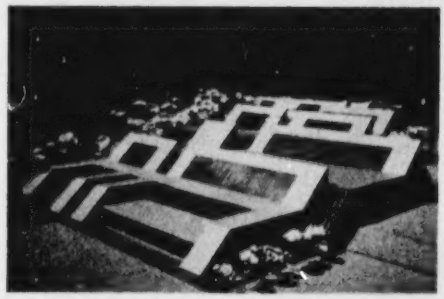
AIA Shirley Carter Awards 1976

also a good example of the compact plan



LYNCHBURG HIGH SCHOOL
Lynchburg, VA

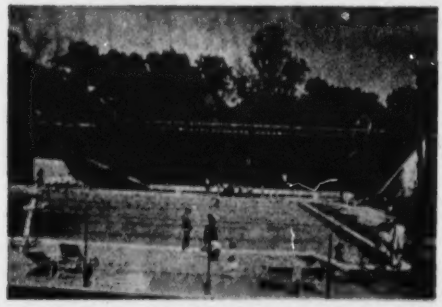
Caudill Rowlett Scott



MADEIRA SCHOOL SCIENCE BUILDING
Greenway, VA

Arthur Cotton Moore

solar energy collectors form the roof surface →



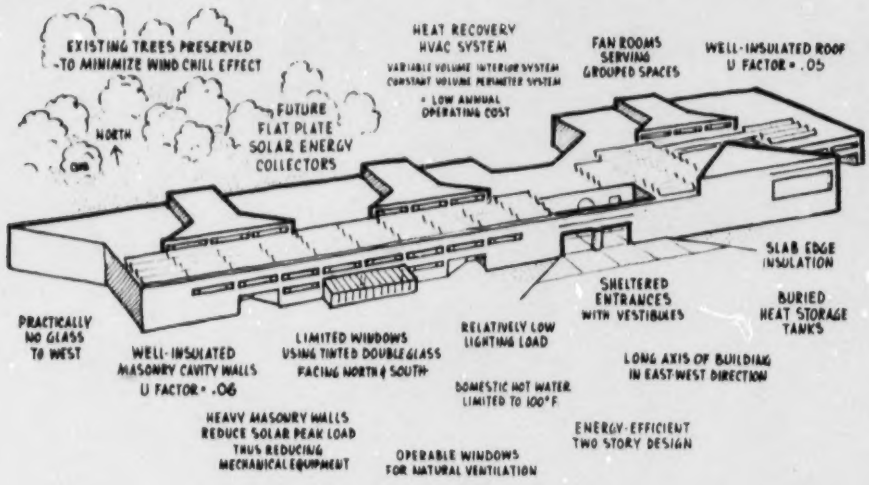
COMMUNITY COLLEGE OF DENVER
NORTH CAMPUS

John Anderson

solar collectors face south →

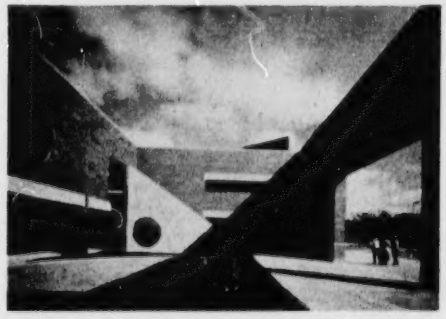
A response to an owners wish to achieve low operating costs —

DESIGN FOR ENERGY CONSERVATION



OAKTON COMMUNITY COLLEGE
DesPlaines, IL

Perkins & Will



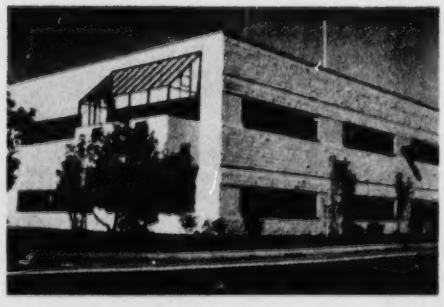
sheltered entrance area →

USING WASTE HEAT

A heat exchanger collects heat from a nearby industrial plant.

STEILACOOM HIGH SCHOOL
Steilacoom, WA

The Burr Associates



SKYLIGHTING ← An idea rediscovered!

Natural light can reduce energy use.

NORMAN ROCKWELL ELEMENTARY SCHOOL
Omaha, NE

Dana Larson Roubal & Associates

skylights illuminate interior →

THE CAMPUS PLAN

Where climate is benign,
outdoor circulation to small buildings
creates efficient and humanistic schools.

LAKESIDE MIDDLE SCHOOL
Irvine, CA

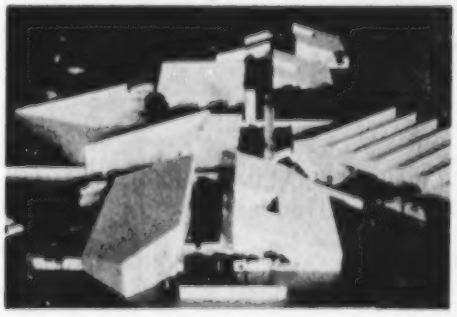
Wm. Blurock & Partners

Most of the schools at Irvine, California,
are village-like clusters of relatively small structures
set into parks and residential areas
with high quality landscaping.

AIA & Shirley Cooper Award 1979

IRVINE HIGH SCHOOL
Irvine, CA

Ron D. Young



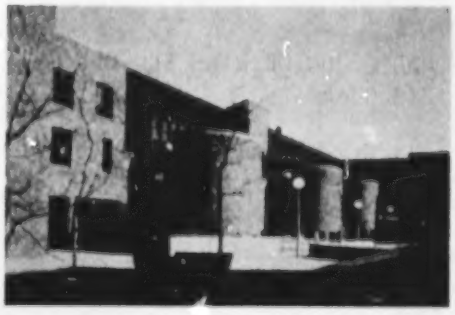
WOODBRIDGE HIGH SCHOOL
Irvine, CA

Perkins & Will

an outdoor student street
links small scale buildings

THE HOUSE PLAN

Even the compact plan urban school
can accommodate schools-within-a-school.



BLACKSTONE SQUARE ELEMENTARY SCHOOL
Boston, MA

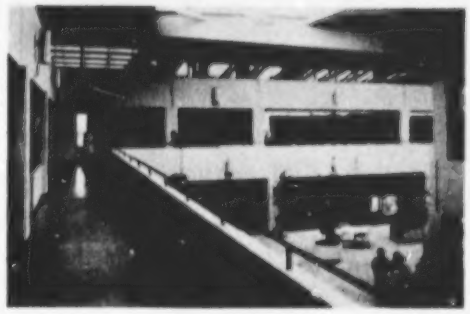
Stull Associates

STUDENT STREETS, MALLS, COMMONS, AND ATRIUMS

Dramatic interior spaces are for circulation and social interchange.

BELLFLOWER ELEMENTARY SCHOOL
Mentor, OH

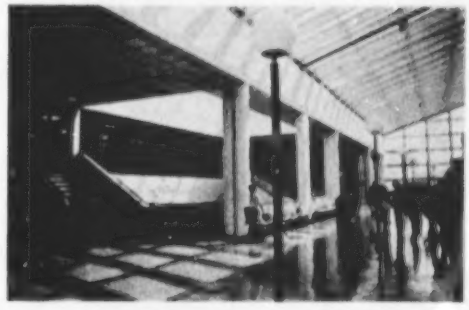
Richard Fleischman Architects, Inc.



GIDDINGS SCHOOL
Cleveland, OH

Don Hisaka

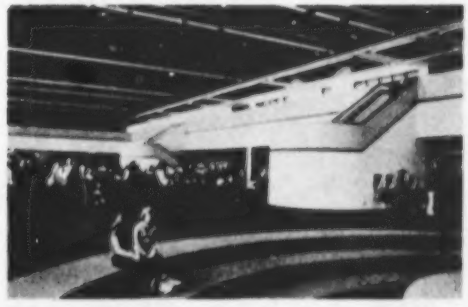
An inward-looking → school in a city neighborhood



HAZELWOOD EAST HIGH SCHOOL
Hazelwood, MO

Wm. B. Ittner

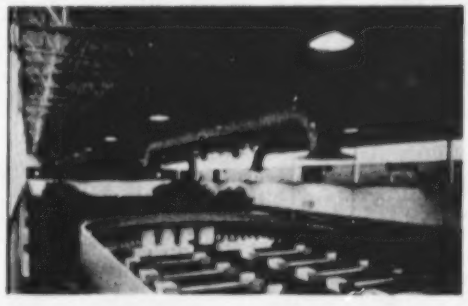
student street is the main circulation system



J.L. MC CULLOUGH HIGH SCHOOL
The Woodlands, TX

McKittrick, Drennan, Richardson, Wallace; and Simmons, Cavitt, McKnight, Weymouth

"two level main street" →



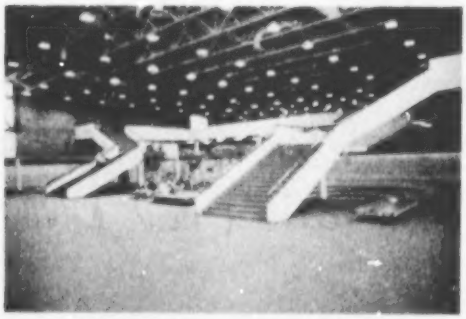
PASCO JUNIOR HIGH SCHOOL
Pasco, FL

Rowe Holmes Associates Architects, Inc.

10

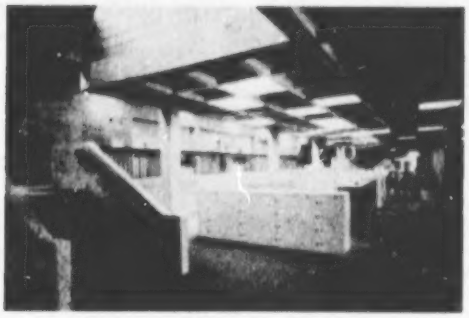
BELLEVUE WEST HIGH SCHOOL
Bellevue, NE

Danna Larson Roubal & Associates



SHAKOPEE JUNIOR HIGH SCHOOL
Shakopee, MN

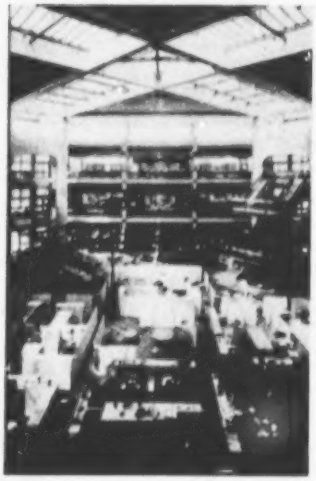
Armstrong, Torseth, Skold & Rydeen, Inc.



GREAT SPACES

Student streets, malls, commons, and atriums bring new excitement to interior spaces for education.

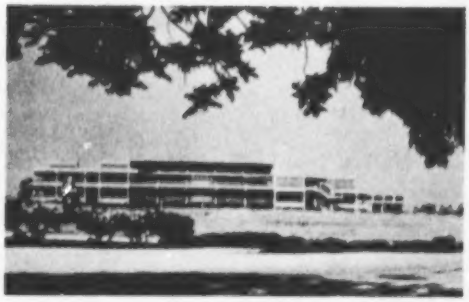
Education, too, enjoys The Age of the Atrium!



MISSION COLLEGE
Santa Clara, CA

Reid & Tarics

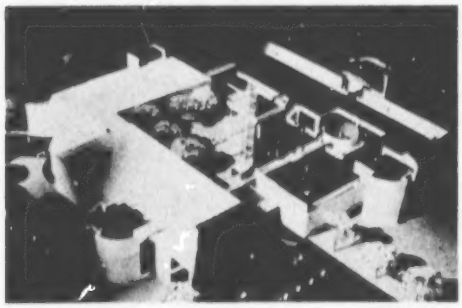
Artist Shirley Cooper Durand 1981



HIGH TECH

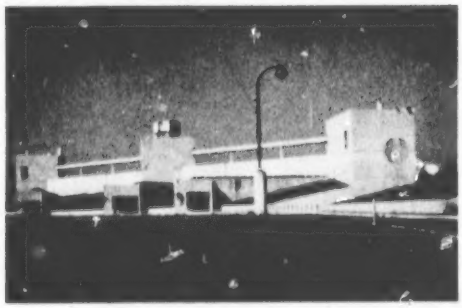
Contemporary industrial materials and technology create a new environment.

using industrial building systems



FODREA COMMUNITY SCHOOL
Columbus, IN

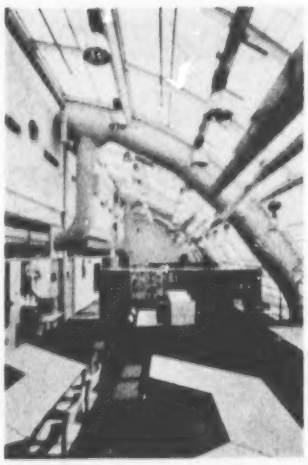
Caudill Rowlett Scott; and Dean Taylor



JACKIE ROBINSON MIDDLE SCHOOL
New Haven, CT

Stull Associates

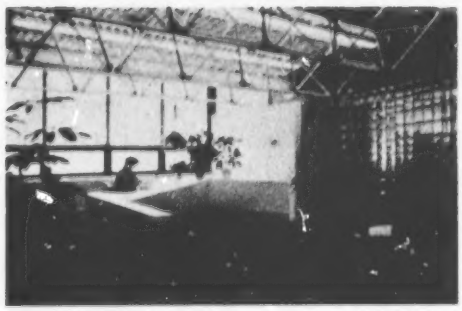
A new high-tech look for education.



TRI-CENTER ELEMENTARY SCHOOL
Neola, IA

Dana Larson Roubal & Associates

including some walls of glass block & steel structure exposed



INNOVATIVE STRUCTURES

New building forms for education.

ROEPER SCHOOL
Bloomfield Hills, MI

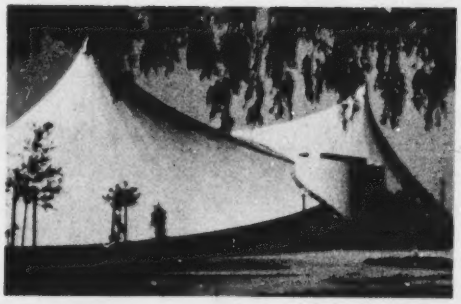
Paulsen Architects

domes under construction

Fiberglass tents held up with masts and cables →

LA VERNE COLLEGE
LaVerne, CA

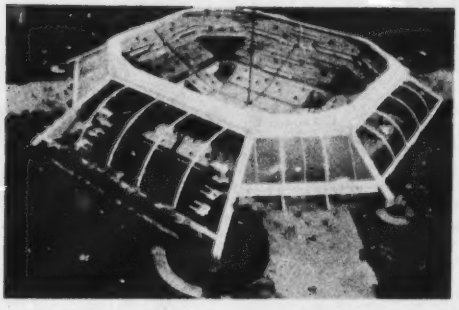
John Shaver

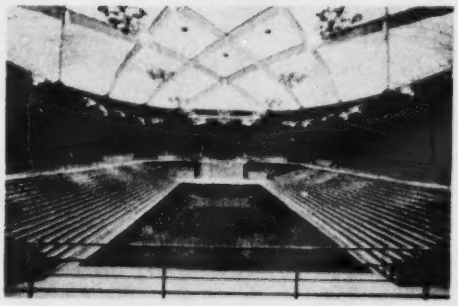


translucent fiberglass fabric structure covers a sports arena seating 12,000

UNIVERSITY OF FLORIDA STUDENT ACTIVITIES CENTER
Gainesville, FL

Caudill Rowlett Scott





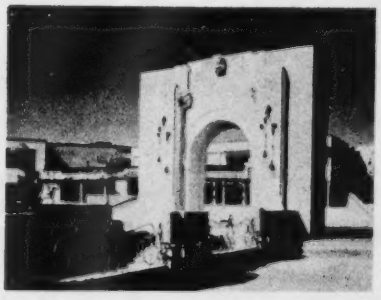
EARTHQUAKE CODE REPLACEMENT

In states where earthquakes occur, new schools and strengthened older buildings are required.

FREMONT HIGH SCHOOL
Oakland, CA

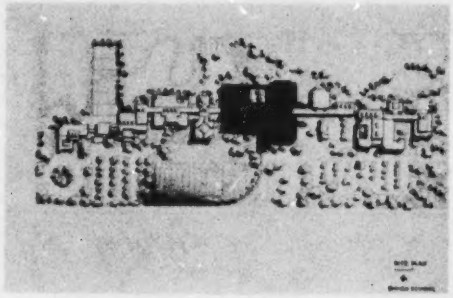
Richard C. Marshall/Chester Bowles, Jr.
Esherick Homsey Dodge and Davis

new and old combined →



THE EDUCATIONAL PARK

A full spectrum of students from kindergarten through high school (and adults, too) sometimes share a common site and linked buildings.



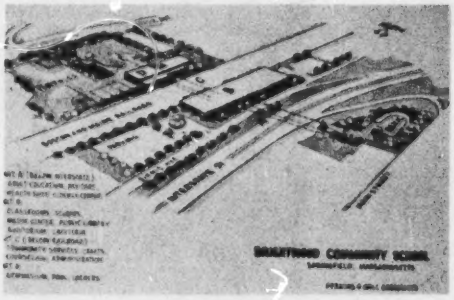
ANNISTON EDUCATIONAL PARK
Anniston, AL

Caudill Rowlett Scott;
and Poole, Parone, Morrison, & Dean

THE COMMUNITY SCHOOL

The school more often also serves as the community center for citizens of all ages.

school and community spaces ↓

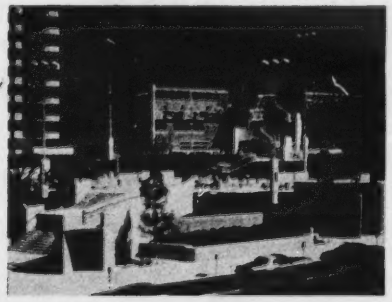


NEW NORTH COMMUNITY SCHOOL
Springfield, MA

Perkins & Will

An unusual site — between and on both sides of Interstate 91 and Boston & Maine RR, so the community school goes under the expressway and railroad.

housing, school, park, and community facilities combined ↓



QUINCY SCHOOL
Boston, MA

The Architects Collaborative

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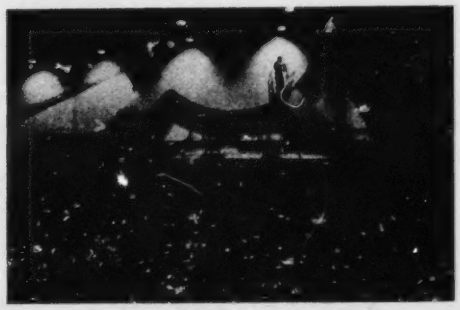
NEW ULM COMMUNITY POOL
New Ulm, MN

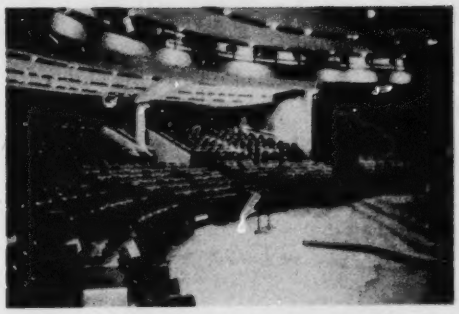
Armstrong, Torseth, Skold & Rydeen, Inc.



serving both educational program needs and the broader needs of the community

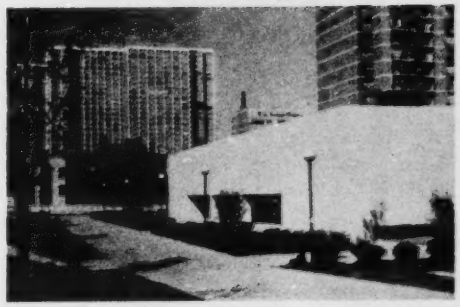
EDINA WEST HIGH SCHOOL
Edine, MN

Armstrong, Torseth, Skold & Rydeen, Inc.



MAGNET SCHOOLS

Schools offering special programs (for example = communications arts) can attract students from a wider community.



DISNEY MAGNET SCHOOL
Chicago, IL

Perkins & Will

pedestrian bridge connects buildings across a city street

WHITNEY YOUNG MAGNET HIGH SCHOOL
Chicago, IL

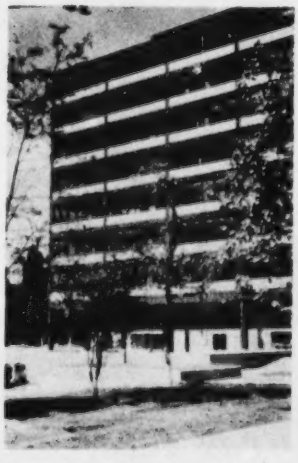
Perkins & Will

URBAN SCHOOLS

Where land is scarce and costly, schools are more compact, taller, and sometimes bridge streets and expressways.

SCHOOL OVER HUTCHINSON RIVER PARKWAY
Bronx, NY

high-rise school with escalators →



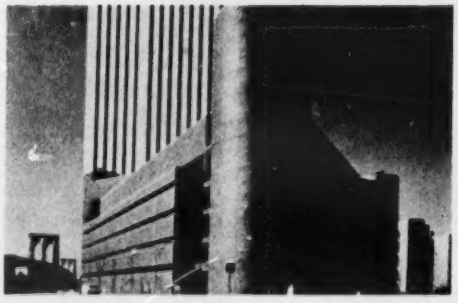
ROBERTO CLEMENTE HIGH SCHOOL
Chicago, IL

Mies van der Rohe

urban forms for an urban neighborhood

ANGELO PATRI INTERMEDIATE SCHOOL
Bronx, NY

The Architects Collaborative



MURRY BERGTRAUM FOR BUSINESS CAREERS
New York, NY

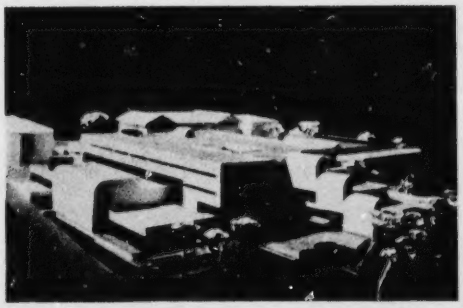
Gruzen & Partners

AIA Austin Taylor Award 1970

WYOMING VALLEY HIGH SCHOOL
Kingston, PA

Caudill Rowlett Scott

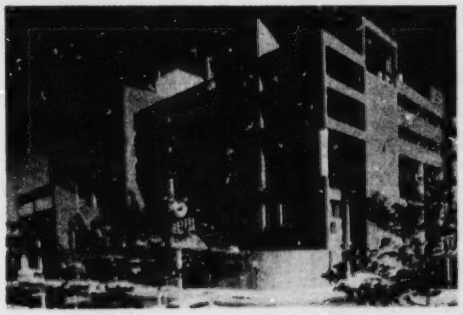
multi-level high school on an urban hillside site



THE CHARLESTON HIGH SCHOOL & COMMUNITY SCHOOL
Charleston, MA

Hill, Miller, Friedlaender, Hollander, Inc.

AIAS Walter Taylor Award 1980

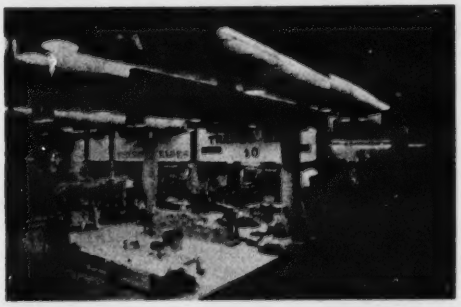


urban architecture

CAREER EDUCATION

Vocational-technical education continues to be an important trend.

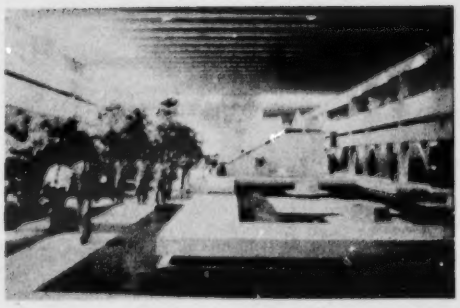
central student mall is the focal point



MINUTEMAN REGIONAL VOC-TECH SCHOOL
Lexington, MA

Drummey, Rosane, Anderson, Inc.

student mall is the center of the school which serves high school students and adults



ROBERT MORGAN VOCATIONAL-TECHNICAL CENTER
Dade County, FL

Perkins & Will

SPECIAL SCHOOLS ...

... include private schools, and facilities for handicapped students.

JULIA BINDEMAN SUBURBAN CENTER
Potomac, MD

Walton, Madden, Cooper, Architects

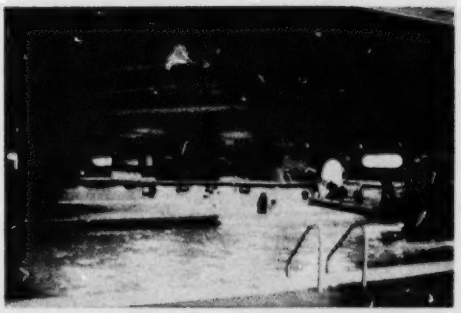
AASA Walter Taylor Award 1979

a barrier-free environment including swimming pool

TIMPANY CENTER
San Jose, CA

Porter-Jensen-Hansen-Manzagol

AASA Shirley Cooper Award 1980



ADDITIONS AND RENOVATIONS

As needs change, existing buildings are expanded and rehabilitated, with new additions, and changes to existing spaces.

MUSKEGON HIGH SCHOOL ADDITIONS
Muskegon, MI

Daverman Associates

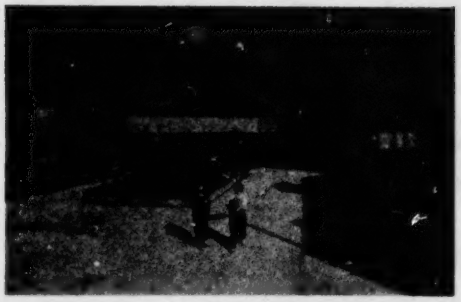
new + old combined →

MANHATTAN MIDDLE SCHOOL
Manhattan, KS

Schaefer & Associates

new entrance link between two existing buildings →

renovation of existing buildings plus new additions and connecting skywalks

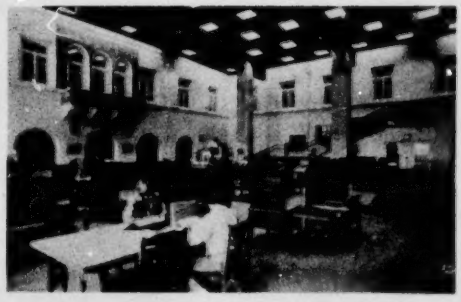


skywalks → connect buildings

FREMONT JUNIOR HIGH SCHOOL
Fremont, NE

Dana Larson Roubal & Associates

old plus new combined



PIEDMONT HIGH SCHOOL
Piedmont, CA

the library is the center

Reid & Tarics

a new environment for student dining

ANDOVER HIGH SCHOOL ADDITIONS & REMODELLING
Bloomfield Hills, MI

Brown & Deyo;
and Perkins & Will Partnership of Michigan

large new resource center developed within existing space →

RESOURCE CENTER AT CROW ISLAND SCHOOL
Winnetka, IL

Perkins & Will

renovation of a 65 year old school →

ROSE CITY PARK PRIMARY SCHOOL RENOVATION
Portland, OR

Facilities Planning Group, Architects

RECYCLING — OTHER BUILDINGS FOR EDUCATION

A wide variety of structurally sound existing buildings have been successfully recycled to create new spaces for learning.

former high school industrial arts building re-planned as a student center

STUDENT CENTER
TULSA JUNIOR COLLEGE
Tulsa, OK

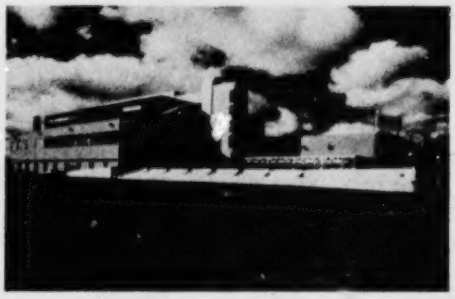
HTB, Inc., Architects

50 year old industrial building saved and converted into a fine new educational facility

JAMAICA PLAIN H.S. AND COMMUNITY SCHOOL
Boston, MA

Peirce, Pierce & Kramer

now serving 1200 students and the community



UNIVERSITY OF PUGET SOUND
SCHOOL OF LAW
Tacoma, WA

The Burr Associates

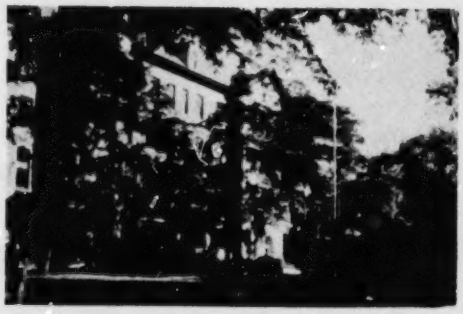
recycled 1910 department store

20

SURPLUS SCHOOL SPACE ...

... converted to serve new purposes.

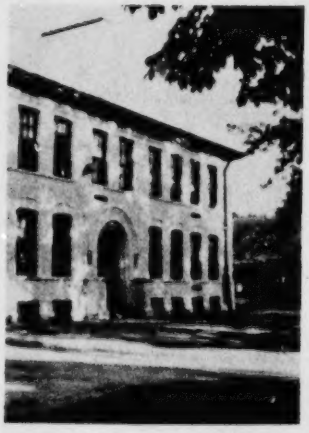
NILES EAST HIGH SCHOOL CONVERTED TO
OAKTON COMMUNITY COLLEGE
Skokie, IL



CATHOLIC HIGH SCHOOL CONVERTED TO
EVANSTON CIVIC CENTER
Evanston, IL

KINGSLEY SCHOOL CONVERTED TO
CHANDLER/KINGSLEY COMMUNITY CENTER
AND NORTH LIGHT REPERTORY THEATER
Evanston, IL

One of many Evanston schools successfully converted to other uses



NOYES SCHOOL CONVERTED TO
NOYES CULTURAL ARTS CENTER
Evanston, IL

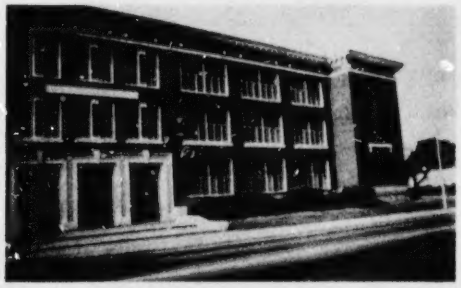
classrooms are leased to artists for studios

CUMBERLAND SCHOOL CONVERTED TO
SEDCO HEADQUARTERS
Dallas, TX

1890s school downtown converted to offices →

SCHOOLS CONVERTED TO HOUSING
.... a hot topic for the 1980 decade

SOUTH HIGH SCHOOL CONVERTED TO
400-BED RESIDENTIAL JOB CORPS CENTER
Grand Rapids, MI

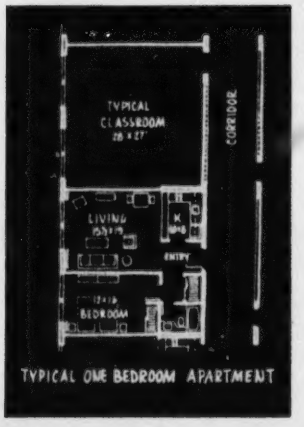


1915 DE WITT HIGH SCHOOL CONVERTED TO
APARTMENTS AND SHOPS
Ithaca, NY

An early example of conversion to apartments

TYPICAL CLASSROOM CONVERTED TO
ONE BEDROOM APARTMENT

typical classroom of 700-800 sq.ft. is an ideal size for one bedroom apartment

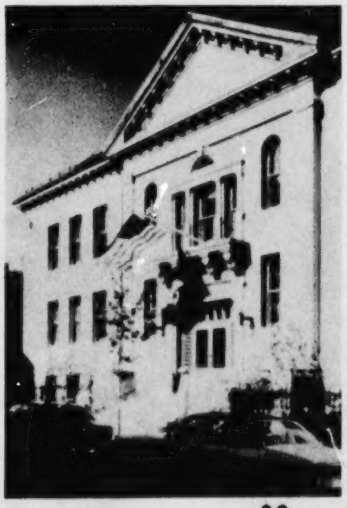


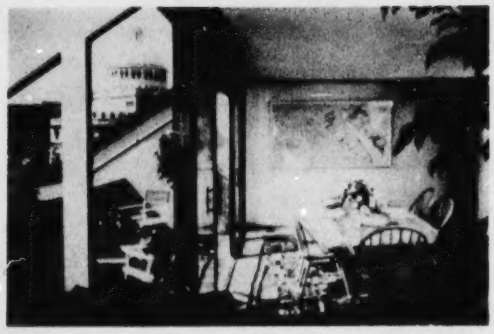
TYPICAL ONE BEDROOM APARTMENT

CHARLES C. PERKINS
ELEMENTARY SCHOOL
CONVERTED TO
"SCHOOL HOUSE
APARTMENTS"

Graham-Gund
Associates

a splendid model for future conversions





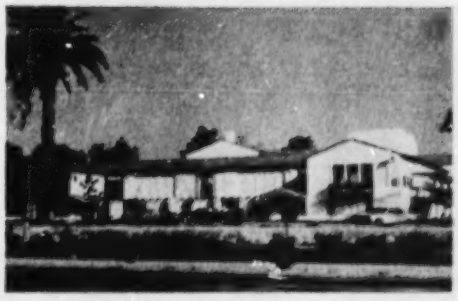
More examples = REUSE OF SURPLUS SPACE

Recycling and Adaptive Re-Use are hot-topics for all kinds of buildings

OLD HOUSE CONVERTED TO
FUNERAL PARLOR CONVERTED TO
RESTAURANT CONVERTED TO
ASBO OFFICES
Park Ridge, IL

HIGH SCHOOL CONVERTED TO
GRISWOLD'S OLD SCHOOL HOUSE SHOPPING CENTER
Claremont, CA

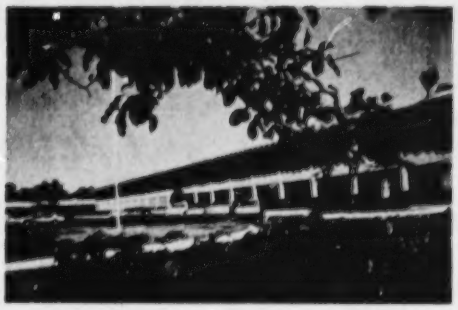
A beautiful 1920s school recycled to create a shopping center with character!



BELL SCHOOL CONVERTED TO
"OFFICE-IN-THE-PARK"
Wilmette, IL

Caudill Rowlett Scott; and Linden & Linden

Imaginative adaptive re-use →

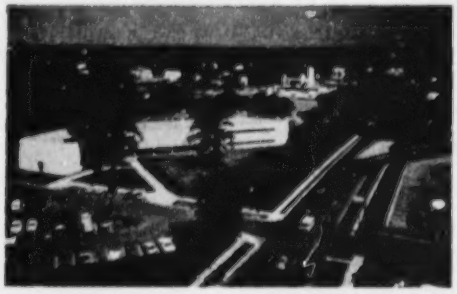


PLANNING FOR FUTURE RE-USE

A building for education can be planned with future uses in mind.

DES MOINES AREA COMMUNITY COLLEGE
DESIGNED FOR RE-USE AS AN OFFICE BUILDING

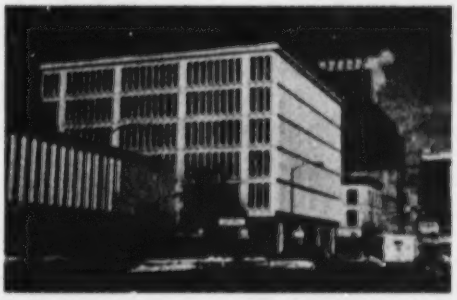
Bussard/Dikis Associates, Ltd.



Chicago Loop school designed for future vertical expansion — and possible conversion to office building

JONES COMMERCIAL HIGH SCHOOL
Chicago, IL

Perkins & Will



ENVIRONMENTAL CONCERN

The finest school design achieves harmony between the natural and man-made environment.

BRIGADOON ELEMENTARY SCHOOL
Federal Way, WA

Robert Price

REGIONAL CHARACTER

America is a huge country with great diversity in geography and climate; therefore, great variety in architecture for education is both inevitable and desireable.

OCEANVIEW HIGH SCHOOL
Huntington Beach, CA

Wm. Blurock & Partners

Wood construction makes sense on the West Coast

reflects the architectural heritage of Cape Cod →

AIA Walter Taylor Award 1977

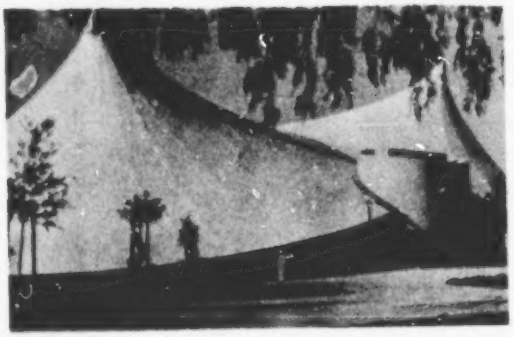
BREWSTER ELEMENTARY SCHOOL
Brewster, MA

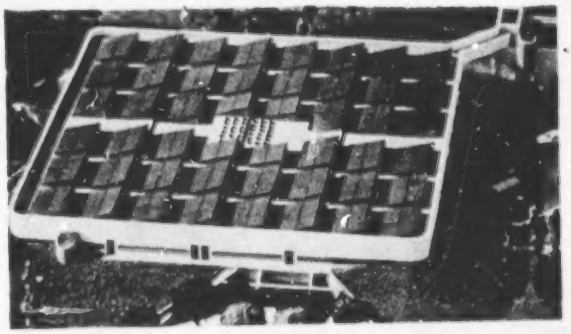
Hill, Miller, Friedlaender, Hollander, Inc.

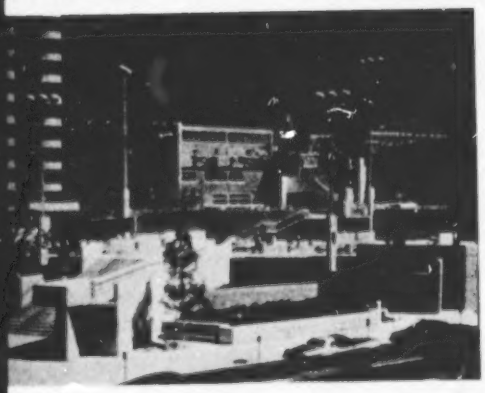
in the spirit of the architecture of Nantucket Island →

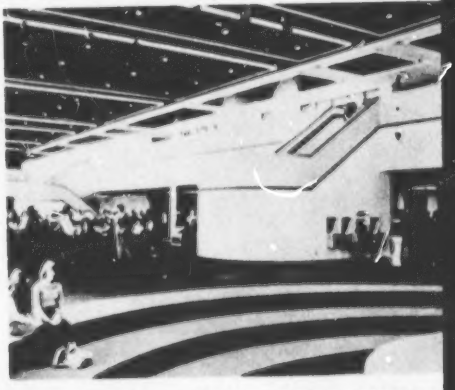
NANTUCKET ELEMENTARY SCHOOL
Nantucket, ME

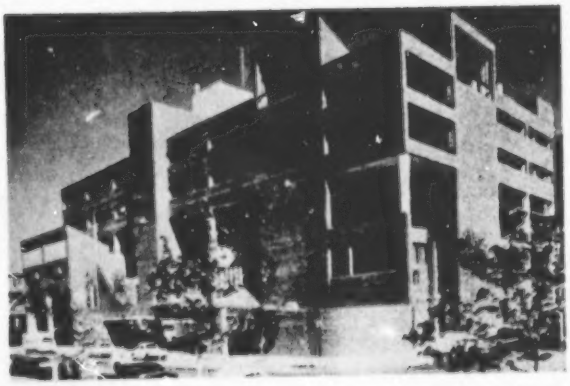
Earl R. Flansburgh & Associates, Inc.

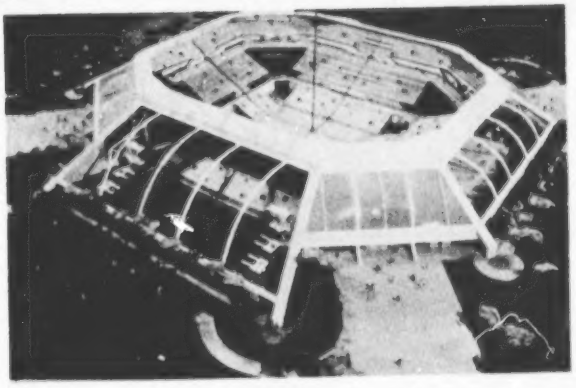


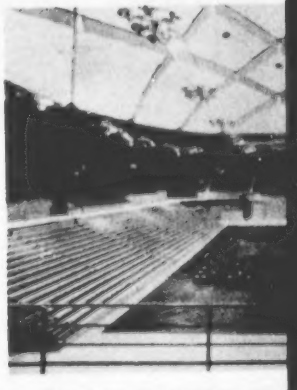


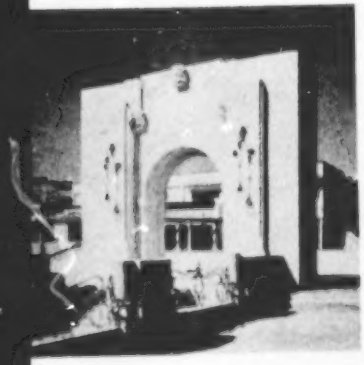


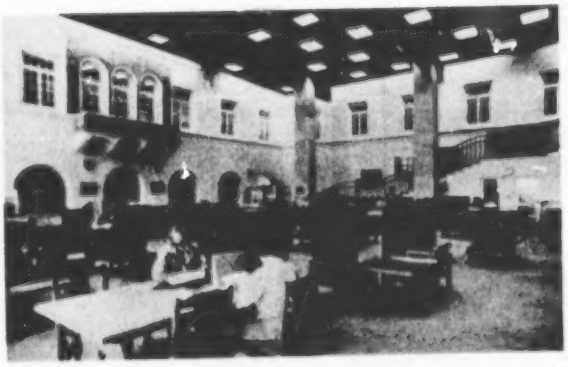




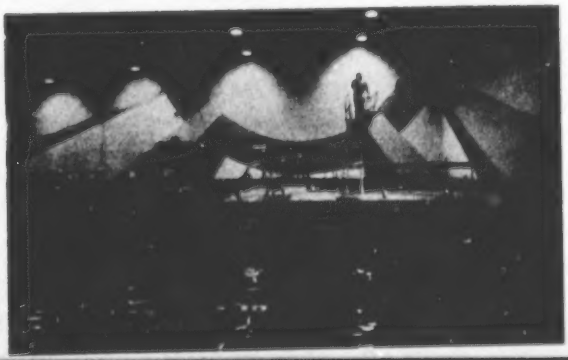








barbados village inn



Perkins&Will

EA 015 471

SCHOOL DESIGN - STATE OF THE ART

by C. William Brubaker
Executive Vice President
Perkins & Will Architects

The Committee on Architecture for Education of The American Institute of Architects has been studying recent trends in school design.

We recognize the following significant design directions which influence the character of school facilities.

FLEXIBLE SPACE AND THE COMPACT PLAN

The new schools are flexible schools. They can adapt to change. Interior spaces can be rearranged to accommodate new educational programs. A response to this desire for flexibility is the compact plan which helps to create adaptable space much like the changeable space provided by a modern office building.

DESIGN FOR ENERGY CONSERVATION

Walls and roofs are well insulated to save energy. Windows are more often designed with double glass, they are operable to encourage natural ventilation in good weather, and they are oriented to the south and north but not to the west. Mechanical systems incorporate new concepts as "heat recovery" to save excess heat during the day and to use that heat at night to keep the building warm.

Trees shade south-facing windows, and trees also protect the school from wind. Earth berms provide natural insulation, and some school buildings are partially underground, with landscaping integrated with roof design. These "passive" design features are indeed saving energy.

Interesting experiments are in progress using "active" solar energy collectors to provide warm water, and by using photovoltaic cells and wind machines to generate electricity. In the next decade we will see further developments in the search for energy efficiency.

THE CAMPUS PLAN

Where the climate is benign, outdoor circulation and outdoor dining and physical education make sense. Many California schools are planned with a number of smaller buildings arranged as a campus, creating efficient and humanistic spaces for education.

STUDENT STREETS, MALLS, COMMONS AND ATRIUMS

Just as dramatic interior spaces have become the focal points of hotels and shopping centers, schools have also incorporated the idea of creating malls and atriums. These impressive spaces are often formed without adding extra space, by combining circulation space, commons, dining, exhibition space, etc.

HIGH TECH AND INNOVATIVE STRUCTURES

Contemporary materials and building technology are used to produce schools with a new look and with new kinds of spaces. Exposed structure and mechanical systems are common. Domes, tents, and air-supported roofs have produced dramatic buildings for education.

THE COMMUNITY SCHOOL

The school more often also serves as the community center for citizens of all ages. In addition to serving the traditional educational programs, the community school provides space for adult education, day care, health programs, recreation, library, clubs, and cultural programs.

Exceptionally fine specialized facilities, such as swimming pools and auditoriums, can be more readily justified when used day and night, all year, by both students and adults.

MAGNET SCHOOLS

Schools offering specialized programs in the arts, science, business or technology can attract students from a broader geographic base. Students at magnet schools get to know other students from a broader area.

URBAN SCHOOLS

Where land is scarce and costly, in urban neighborhoods, school buildings are taller and more compact. They are more urban in character. Urban schools sometimes are served by elevators or escalators, and often bridge streets. They are more a part of their neighborhood and are more strongly influenced by surrounding structures.

CAREER EDUCATION

Vocational-technical education continues to be an important trend. Special schools for business education and for the arts provide new learning opportunities. The "shared time" career center serves one group of students from various high schools each morning, and another group each afternoon, and may provide for adult education in the evening.

ADDITIONS AND RENOVATIONS

As needs change, existing buildings are rehabilitated and expanded. We recognize the high quality of some of our older buildings. Many of them are being renewed with interior alterations, with exterior rehabilitation, and with additions.

RECYCLING OTHER BUILDINGS FOR EDUCATION

As population shifts occur, school facilities are not always located where new space is needed. Substantial industrial buildings and stores have been successfully recycled to create school space.

SURPLUS SCHOOL SPACE

The more common problem is the existence of school space which is no longer needed for education. Many schools have been imaginatively converted to serve new purposes.

School buildings have become office buildings, shopping centers, medical centers, municipal buildings, art centers and apartments. Especially in New England, converted schools have proved to be popular as new kinds of places to live, providing apartments with unique character.

PLANNING FOR FUTURE USE

We predict that future schools will be designed to permit economical conversion to other uses. Location is the key consideration. If the school is located on a commercial street, it should be designed with commercial use in mind. If it is located in a residential neighborhood, it should be designed with conversion to apartments in mind.

REGIONAL CHARACTER

America is a huge country with great diversity in geography and climate. Therefore, great variety in architecture for education is both inevitable and desirable. A Texas school should not be the same as a Michigan school. A Massachusetts school, a Florida school, and an Arizona school present entirely different design challenges. We should welcome that regional diversity.

* * * * *